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Our PUBLIC LANDS

BUREAU OF LAND MANAGEMENT

OCTOBER 1958 • Volume 8, Number 2

OUR PUBLIC LANDS . . .

"Conservation is a state of harmony between men and land. By land is meant all of the things on, over, or in the earth. Harmony with land is like harmony with a friend; you cannot cherish his right hand and chop off his left. That is to say, you cannot love game and hate predators; you cannot conserve the waters and waste the range; you cannot build the forest and mine the farm. The land is one organism. Its parts, like our own parts, compete with each other and cooperate with each other. The competitions are as much a part of the inner workings as the cooperations. You can regulate them—cautiously—but not abolish them."

(*From* "Round River—From the Journals of Aldo Leopold," edited by Luna B. Leopold, Oxford University Press, 1953.)

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COVER

The job of surveying the public lands takes BLM cadastral engineers through steep and rugged mountains to lay out the familiar checkerboard of townships and sections. The survey party in the picture are climbing to a high point where they will set up their latest addition in modern survey equipment—an electronic distance measuring device. For more about measuring distances electronically see page 8.

ABANDONED HORSES ON THE FEDERAL RANGE

ABANDONED horses in the range country, popularly believed to be wild horses by the general public, are a continuing problem in proper range management and conservation. The horse as we know it today was not native to North America. Legends of the beginning of the wild horse herds are varied. Some people credit Hernando Cortez with landing the first horses on North America, early in the sixteenth century. Others believe that Columbus first introduced them to the Western world. The nucleus of the wild horse herds were probably formed from those brought here by the Spanish, and many of these bands were escapees from the seventeenth century mission ranches established in lower California.

By 1890 the true mustang was fast disappearing due to the rapid settlement of the open range country and the fencing of farm and ranch units. Walker D. Wyman, in his book *The Wild Horse of the West*, says "The term mustang has been misused by many to refer to the wild horse, whether in the seventeenth or the twentieth century, to the cow pony of today, and to all other stock that has been used in the West. The word is said to have come from the Spanish mesteño which came from mesta, meaning a group of stockmen. Horses which escaped from a mesta and ran wild were mesteños, the 'eño' suffix meaning 'belonging to.' Regardless of the exact origin of the word, the term mustang was applied to the original wild horse that came from the Spanish herds."

In large bands these wild horses roamed the range lands. They lured away domestic stock, tore down fences, and were nuisances generally. Epidemic and starvation during the severe winters contributed to their fast disappearing numbers. Later, World War I took its toll of the herds, large numbers being used by the cavalry. Then the introduction of power equipment brought about a sharp decrease in the use of horses in ranching operations and many ranchers simply turned their stock loose on the range. These joined the remnants of the bands that had escaped captivity, taxing to the limit the already overgrazed and run down condition of the public range lands.

Government control of the range lands in the form of the Taylor Grazing Act was finally enacted. Before its passage on June 28, 1934, probably more than 100,000 of these unclaimed horses were grazing the public lands. Officials were confronted with a most serious range depletion problem. These horses were on the range twelve months of the year, at seasons when grazing was most harmful to forage plants. Where supplies of stock water were critical, wildlife and domestic livestock were driven away from water holes by the wild herds and deprived of their use of the range.

It is not the policy of the Department to eliminate these wild bands, even if that could be done. It is the policy to control their numbers so as to conserve the needed forage for licensed livestock, and for game animals, such as deer, elk, and antelope. The only way these horses can be controlled is through organized roundups, conducted under the abandoned and estray animal statutes of the states.

Under these laws the gathering of unclaimed horses ordinarily is carried on by private citizens. When they are gathered by the use of saddle horses only, the customary practice is for a number of riders to surround a wild band and head them toward a corral or place where they are to be gathered. One rider is usually in the lead to guide them and the others follow behind to keep the band in a compact herd. If a plane is used, it usually circles the horses and comes in from the side that will start them in the right direction. The pilot then heads the horses toward the corral or trap. Men on horseback are posted at strategic places to direct the horses into the corral.

Most of the horses so gathered are found to be branded, and in some cases brands of livestock outfits that have long gone out of business are found on the animals. Since most roundups are managed or participated in by persons owning or having an interest in the horses, they are handled as carefully as possible. When the Bureau of Land Management finds it necessary to conduct a horse roundup, appropriate state or county officers are notified of the operation and upon its completion known owners of livestock are given an opportunity to redeem their animals, subject to payment of costs and charges.

Instances of cruelty in the gathering of these animals have been reported. Local officials have

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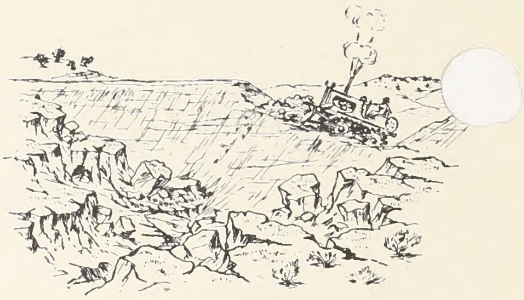
CORNFIELD WASH: A CONSERVATION PROVING GROUND



by HARRY W. PEARSON, *Ronge Conservotionist*, Santa Fe, New Mexico, BLM

TO the East of the Navajo Indian Reservation in northern New Mexico, an area interspersed with public domain lands has long been used by Navajo families. These Indian people have lacked certain benefits accorded those living on the Reservation. The land, already taxed beyond its capacity to support the flocks necessary for subsistence, suffered pronounced deterioration from over-use and recurrent drouth. The bottom lands of the waterways and washes which had provided arable land for several generations were further gullied with every runoff from denuded ranges until only remnants remained. This was the story of Cornfield Wash.

The small rock and brush dams which the Indian had used to divert summer floods to fields of corn, beans, and squash in the lower portions of the watershed had ceased to be practicable. With the advancing gullies, the water table was lowered and good forage species died out. Under severe grazing, the decline of the ranges and the corn fields increased the plight of the Navajo dependent upon them. Such were the conditions observed by the Bureau of Land Management eight years ago when the Bureau started its rehabilitation program in the area.

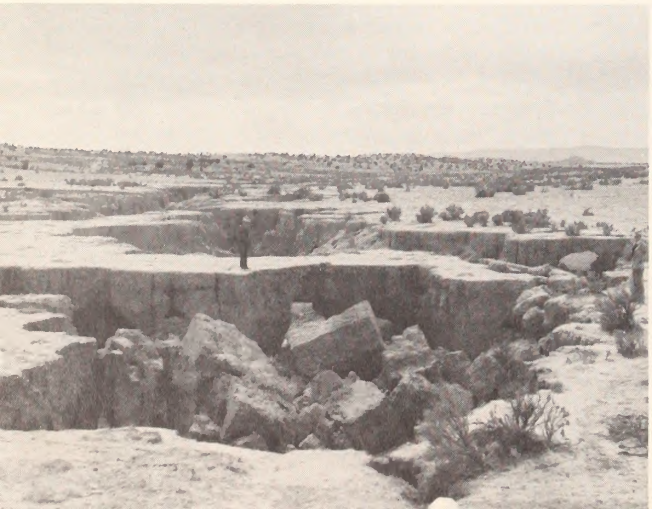
A good portion of the watershed is public domain. BLM recognized its responsibility and embarked upon a program to check the active erosion and to rehabilitate the range. The conservation program in the Cornfield Wash area was designed so that the Indians would not only recover their economic base but also would receive many indirect benefits such as a more dependable water supply for their range animals and for their small corn fields.

The long term objectives of the conservation program were to stop the destruction of the watershed by erosion and the eventual reversal to increased productiveness of the land.

In an article in the July 1951 issue of *Our Public Lands*, the writer described the results of destructive soil erosion in Cornfield Wash and its effects upon the livelihood of 50 Navajo families residing in the watershed. The Bureau in 1950 had started a rehabilitation program to halt t tremendous soil losses caused by advancing gull and to restore the productivity of the watershed lands. One Navajo had already lost two small farms to the main Cornfield Wash gully and had hopefully moved to a third one some distance upstream from the advancing headout.

The 1951 article outlined the approach taken by the Bureau in constructing earthen detention dams to control the gullies and conserve the scanty moisture supply. Several years were required to complete the installation of the dams which together with soil pitting and deep tillage made up

BEFORE AND AFTER conservotion proctices have been opplied. The results of better land monogement ore obvious, as vegetotion again tokes root and erosion stops.



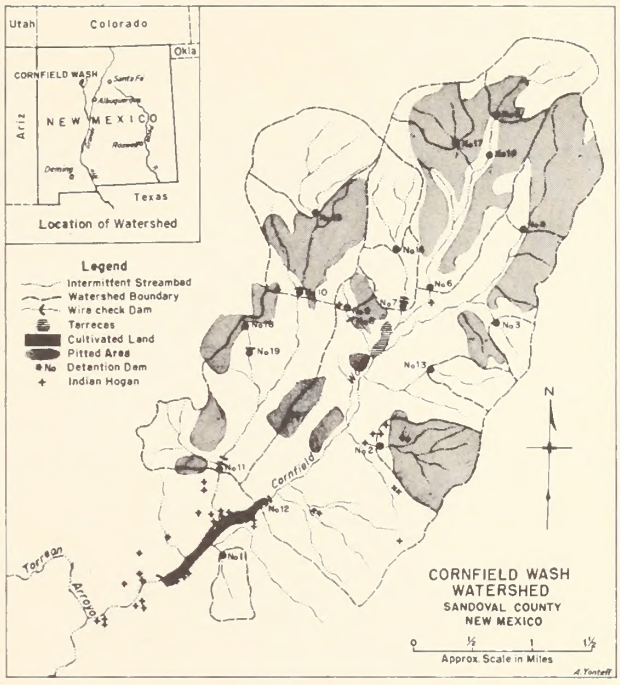
the major part of the conservation program. With completion of the watershed program, the Bureau has an outdoor laboratory to measure the influences of the conservation practices, the result of which are used as guidelines in designing watershed programs for similar areas. Technicians from the Geological Survey have installed runoff and sediment measuring instruments which provide precise yardsticks for determining the effectiveness of the watershed program.

Seven years have elapsed since the first Cornfield Wash story appeared and it is most timely that we now take another look at the watershed and examine the results of the Bureau's program. During the intervening years, the watershed has been plagued with protracted drouth and severe cloudbursts, subjecting the program to exacting tests. What has happened to the watershed and its people is reported below.

In planning the conservation program for the Cornfield Wash, as in similar watersheds, the Bureau realized that recovery to relatively high productiveness, even under the best of circumstances, would require many years. A major part of this program was to make the people aware of the fact that the main reason for the many present gullies, the extensive coverage of unpalatable shrubs and trees such as rabbit brush and juniper, and the disappearance of good forage grasses is from uncontrolled grazing by too many sheep, goats, horses, and cattle over a long period of time. Recovery to a reasonably productive condition cannot be obtained until proper grazing use of the range is understood and is practiced by the land users. Erosion control structures and land treatment measures merely supplement and complement good range management. They cannot replace it.

Nineteen earthwork structures have been completed by the Bureau of Land Management in the Cornfield Wash drainage in the last eight years. For the most part, these are detention dams to temporarily hold back flash floods. Wherever feasible, these have been placed at the heads of advancing gullies in order to save what is left of the upstream valley floor. Stock water has been retained in many of these detention dams to permit better distribution of grazing use over the range, to reduce trailing, and to minimize concentration of livestock around the few watering places.

The valleys in this watershed are narrow and the gullies are deep. Water impounded in the detention dams is released through pipes to prevent the formation of new gullies. Once accumulated in a gully in the Rio Grande Watershed in New Mexico, the water cannot be taken out and spread over range lands. Under State law, water spreading in the Rio Grande basin is forbidden because all of the available water has been appropriated. As an alternative practice in Cornfield Wash, and throughout the Rio Grande basin in general, the Bureau constructs detention dams



LOCATION MAP shows location of Cornfield Wash and places where projects have been constructed.

to reduce to a minimum the accumulation of flash flood flows into the gullies.

The retention of soil at or near its "original" site involves not only the rehabilitation of the Cornfield Wash watershed but also lands downstream. The Cornfield Wash watershed embraces about 20,000 acres. It is a subdrainage of the Rio Puerco Community Watershed which is the highest sediment producing area in the Rio Grande drainage. The sediment comes from upstream progress of *headcut* action and from gully banks sloughing off. Sheet erosion is common but it does not produce as high volume of sediment as gully erosion. Each storm contributes to the sediment which eventually reaches Elephant Butte Reservoir on the main stem of Rio Grande unless it is stopped in earthwork structures, such as detention dams, constructed in the upper watershed.

One important practice is being employed on the range area of the Cornfield Wash to reduce runoff and to induce greater infiltration. These are *pitting* projects to retain soil and moisture. Several thousands of acres in the Cornfield Wash have been pitted in the last three years. The curved points of the pitters form small reservoirs by lifting out clumps of earth as the pitters are drawn forward. When the pits have been filled with soil, that soil will remain friable (crumbly) for a period of years to favorably influence moisture infiltration. With proper use, the range will improve and the rate of runoff and sediment movement will be reduced.

Through a study undertaken by the Geological

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INTENSIFIED PUBLIC RESOURCE MANAGEMENT

by EDWARD WOOZLEY, *Director*, BLM

WHEN talking about resources there are some numbers that keep ringing in our ears: 172 million, 215 million, 300 million, 434 billion, 711 billion.

What are these numbers? Aside from being very large numbers—much too large for most of us to grasp—they are measures of things that many of us may live to see. Let me explain what all these big numbers are about.

According to the Census Bureau the population of the United States recently passed the 172-million mark. The same people tell us that by 1965 our population will reach 190 million. And by 1975—about the time a baby born today will be graduating from high school—the population will probably exceed 215 million. And looking ahead another 25 years to the year 2000, it has recently been estimated the total population of the United States may easily top 300 million people. In fact, one projection of the Bureau of Census' estimates would imply a total United States population in 2000 of 360 million people—more than double the present number.

That's the picture of what we can expect in terms of population growth, but what about productivity?

Last year, according to the President's Council of Economic Advisors, the total value of all goods and services produced in the United States amounted to more than $434 billion and personal income to $343 billion. People who are making these kinds of estimates tell us that the national output of all goods and services by 1975 can be expected to reach $711 billion, measured at present prices. In other words, the goods and services output in 1975 will probably be about 70 percent larger than it is now—a 70-percent increase in about 20 years. And that is just about what has been happening for the last hundred years and more. And what about the year 2000? One recent Government estimate places the total value of all goods and services produced in the United States in the year 2000 at $1,200 billion to $1,450 billion, measured in terms of current prices. That would be 1 trillion, 200 billion dollars—and that is a number that looks big even in this age of Explorers, Vanguards, and Sputniks.

If this country continues to grow in population and economic wealth as it has grown in the past, there are other kinds of growth and expansion that will have to take place. This is where resources come in.

Take food for example. Using 1950 consumption as a base, we will need about 42 percent more food products by 1975 to meet the increased demand from an expanding population. By the year 2000 we can expect to have to double our present output of food.

In order to meet the demand for power, and heat, and light, under the assumptions for growth I just mentioned, the production of coal, gas, and petroleum will have to double by 1975 and double again by the year 2000. Part of these demands for energy will no doubt be met by the development of large-scale powerplants using the enormous amounts of energy available in the atomic nucleus. As for the nonfuel minerals, consumption can be expected to rise more than 75 percent by 1975. The pattern is much the same for all other raw materials.

As an over-all indication of the demands which the future is likely to make, it has recently been estimated that the total input of all physical-structure materials (that is, all nonfuel-nonfood raw materials) will increase by approximately 50 percent by 1975. The estimates for the year 2000 show increases in the raw materials from which we make and construct the things we use of from 161 to 211 percent over that which we have used in the recent past.

The impact of our expanding population and economy upon the land and resource base of the Nation is clear. People often ask: where will all the resources come from to support that kind of economic growth? That question has bothered people for a long time. It bothered the people who started what we now call Conservation.

The answer is probably very complex. Many resources that were wasted or destroyed in the past are now put to use. We shall have to meet the problems of our future in about the same way—through wiser and more efficient use of the land and raw materials nature has given us to work with. This concept of conservation through

wise use is the cornerstone of modern goals and practices of land and resource management.

Some of the increased demand for land and raw materials will be met by increasing the efficiency and productivity of present production methods and resource uses. Improving mineral technology may, for example, make it possible to economically utilize many of the known reserves of low-grade ores.

There will probably be much more recycling of used materials, extending such practices as that now established in the pulp and paper industry where waste paper now accounts for over 25 percent of the fiber materials used in the manufacture of paper and paperboard. We may reasonably expect the development of whole industries, whose jobs it will be to reprocess certain materials for re-use in the manufacturing cycle.

In meeting tomorrow's demands, we will salvage more and more waste materials formerly lost or abandoned. This will come partly through the developments of secondary-processing technologies in many fields and industries. The secondary utilization of sawdust, bark, and other mill wastes in the forest industry is a present example of a practice that will no doubt increase. Other salvage developments may be less obvious—such as programs for the utilization of logging residues left in the woods when timber is harvested and at processing plants. In all, we are now failing to use about one-fourth of all the timber cut.

Another part of the growing demand for materials will be met by the discovery and development of synthetics and substitutes. Some of these will be developed to replace scarce or high-cost materials. Others will be applied as "improvements" upon presently used materials. An example of the latter kind of substitution would be the greatly increasing use of aluminum in automobile manufacturing. We will also probably increase our imports of certain raw materials, such as iron ore and some of the strategic minerals.

But even with all of these efforts we will only begin to meet the total demands of the Nation for the land and materials we may use. As a result of this, there will be new and competing demands upon the lands and resources available throughout the Nation, including our last great frontier area—Alaska.

These demands will come in many forms. We will need to discover and develop new deposits of oil, gas, and other minerals. We will need more and better information about known deposits and reserves, including low-grade bodies that may have been bypassed in previous times. We will need to increase the productivity of existing lands, to produce more food and to support more livestock. This will mean rebuilding lands whose former productive capacity had been eroded away by wind and water and revitalizing lands that have been mined out by over-use and careless practices.

We will need to increase the productive capacity of our timber lands, especially on the four and one-half million small forest ownerships which contain approximately 55 percent of the Nation's commercial forest lands. We will need to improve the protection of forest lands from fire, insects, and disease. These destructive forces now destroy an amount of timber every year equal to about one-fourth of the net annual growth—in fact, more than the amount cut for all timber products. And we will need to maintain and increase the timber harvest capacity of recently cut-over lands by planting young trees and increasing our growing timber stock.

We will also need to increase the efforts that led to the discovery and development of entirely new sources of materials. An example from recent history of this kind of development would be uranium and some of the exotic metals.

Perhaps the most important requirement for much of the Nation's further growth and development will be the conservation and more efficient use of water supplies, for domestic, agricultural, and industrial uses. We are now using more than 262 billion gallons of water every day in the United States—a rate equal to 1,500 gallons, or thirty 50-gallon barrels, for every man, woman, and child in the United States every single day. By 1975 our population will need at least 450 billion gallons of water a day, almost twice what we are using now.

The solution to our water supply problem is being sought on many fronts. In the Department of the Interior, the Office of Saline Water is engaged in research and projects to turn sea and brackish water into supplies for agriculture, industry, and human consumption at acceptable costs. When this program really got underway in 1953 the lowest then estimated cost of converting saline water was $1.50 or more per thousand gallons. Today, there is reasonable expectation of bringing this down to 60 cents a thousand gallons or less.

Another avenue of attack may be through techniques to reduce the tremendous losses of usable water through evaporation. A recent report of the Department's Geological Survey points out that more than 11½ million acre-feet of water are lost to the atmosphere annually from lakes and streams in the 11 western States. Research is now underway to reduce these losses. A promising technique now being tested involves the use of a waxy chemical that spreads a very thin blanket over the surface of the water, thereby preventing much evaporation.

But there will be needs for other resources, including that most-basic-of-all resource, land. This kind of need is now apparent in many areas of the Nation.

As our standard of living increases and people have more and more leisure time, they are making new and accelerated demands for land for a wide variety of purposes. Land is sought for recrea-

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MEASURING DISTANCES AT 669,600,000 MILES AN HOUR

by WILLIAM H. TELLER, *Cadastral Engineer*, Denver, Colorado, BLM

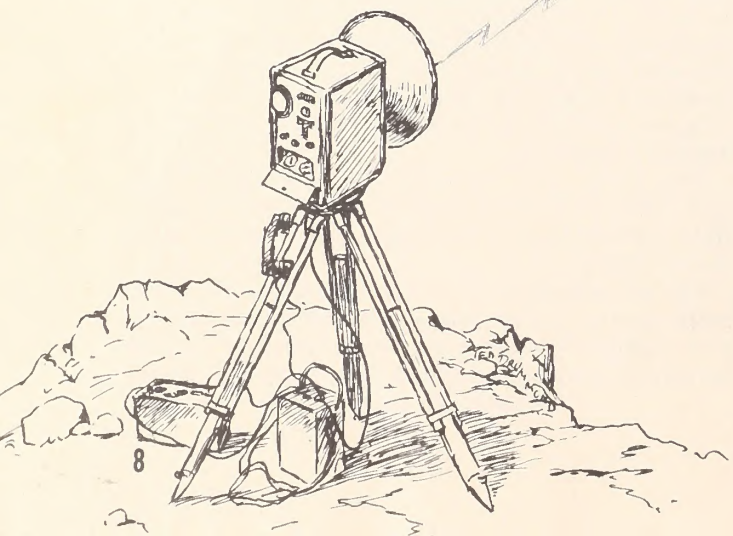
MANY of the basic principles of surveying date all the way back to the early Egyptians. Though the specific methods and equipment the Egyptians used have not survived, we do know their measurements were remarkably precise.

The Great Pyramid of Gizeh (Khufu), for example, is laid out with its base oriented to the four points of the compass. The base of the pyramid was so accurately measured that the four sides (9,068.8 inches) have an average error of only $\frac{6}{10}$ inch in length and 12 seconds in angle from a perfect square. The pyramid was built about 4700 B. C.!

The Egyptians were also very much concerned with the survey of property boundaries for taxing purposes—a job that had to be done many times over in the wake of the annual floods in the Nile Valley.

The job of accurately determining the distance between two points on the surface of the earth has occupied the time and talents of countless generations of surveyors.

Though many advances have been made over the years in the methods and equipment for measuring angles and determining direction—the astrolabe, the marine compass, Vernier scale, sextant and transit, and theodolite—the methods for measuring distances have changed much more slowly.



Historically, distances have been measured by using some known standard length—the length of a man's stride, the distance a man can reach, a rope, a chain, or a tape, and so forth. In ancient times a rope was used. It was first soaked in water, dried, and then coated heavily with wax to insure constant length.

The most significant advance in the easy, rapid, and accurate measurement of distances resulted from the very recent development of electronic measuring devices. These are largely the outgrowth of radio and radar developments perfected during World War II.

Several electronic measuring instruments have been invented and are now in use. All of these instruments operate on the principle of determining the actual distance between points on the earth's surface by measuring the time it takes an impulse of some sort (such as a radio wave) to travel from one point to another and return.

This is like solving the familiar arithmetic problem: if a man walks from his house to the store at 3 miles per hour, and it takes him 1 hour to make the round trip, how far away is the store?

Several media have been used for this purpose. These vary from the measurement of the time between the creation of a *sound* and reception of the echo, to the modern measurement of the time lapse between the transmission of an *electrical impulse* or a beam of *light* and the reception of the "echo" or reflected wave. By using very accurate measuring devices the actual interval between two points can be precisely determined.

Equipment of this type has now been acquired by the Bureau of Land Management for the cadastral surveys on public lands—laying out the familiar checkerboard of townships and sections as the necessary forerunner to effective programs for the conservation and development of our public lands and resources.

When the Bureau was studying some of the electronic measuring equipment for use in public land surveys, three requirements had to be met. The equipment had to be durable, dependable, and portable—all in about equal measure. Equipment that seems to fill the bill is now being used.

The electronic measuring system in use by th

Bureau is a device very much like the directional and distance measuring radar equipment used by the Military Services. It comes in two basic parts—the master unit (which sends out the electronic signal) and the remote unit (which receives the signal and sends it back to the master unit).

Electronic pulses are generated and broadcast at the master unit, received at the remote unit, and then re-broadcast back to the master unit. The signal received at the master unit is made visible on a small cathode ray tube (a cousin of the big tube in a television set) upon the face of which is marked a circular scale. The impulses are read by means of a fine illuminated circle which appears on the face of the tube, the circumference of which is interrupted by a small break, called a "blip."

In addition to the face of the cathode ray tube, certain other controls are located on the instrument cabinet. All reading and recording is done at the master unit. The remote unit only serves as a receiving and re-broadcasting station.

By knowing in advance all of the electronic characteristics of the signal being generated at the master unit (including the speed at which the wave travels) it is possible to measure the distance between the master unit and the remote unit by calculating the time it takes the electronic signal to go from the master unit out to the remote unit and back again. Different time is measured by comparing the "phase" characteristics of the wave as it is transmitted and received.

The system operates on very high frequencies and the time interval is measured in very small units called millimicroseconds (0.000000001 seconds)—a very small interval of time, and one that would be much too small to measure except by electronics.

Readings are taken at several different frequencies in order to minimize certain errors. The time intervals are then multiplied by the speed of the transmitted beam (approximately 186,000 miles per second) and divided by 2 to obtain the actual distance between the two units. Some slight corrections are then made to take into account daily changes in the moisture content of the air, air pressure, and other weather conditions. The calculations are very simple and can be done right on the spot in a very few minutes.

The job of measuring the distance between two points ordinarily takes less than 30 minutes at each station. One of the remarkable characteristics of this electronic equipment is the fact that it can accurately measure 10, 20, or even 30 miles or more with a probable error of only about 3 parts per million, plus or minus 2 inches.

The instruments are set up on their tripods at the stations between which the distance is to be measured. The power supplies are connected and the instruments are warmed up to operating temperature. This usually takes about 10 minutes. After the warm-up period the units are oriented toward each other. If the points are close, so that

the units are clearly visible, the orientation can be made by direct line-of-sight. If this is not practical the orientation can be done electrically. As soon as the orientation is complete the readings are taken to compensate for minor errors. As soon as the measurements are made the remote unit is called on the radio telephone and instructed to move on to the next station.

The use of radio telephone communications along with electronic measuring equipment is particularly useful in cadastral surveying. In the remote station, located at a spot assumed to be in the vicinity of a survey corner, the operator can be told on the radio how to get into exactly the right position. Likewise, if the remote operator finds a corner he can advise the master station about it. In actual field experience the Bureau has found it possible to complete the resurvey of several miles of line from a single setup of the master station.

Though there are some practical "bugs" which will have to be worked out it looks as if electronic distance measuring equipment is here to stay. Though the equipment is relatively portable, it

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ELECTRONIC EQUIPMENT is set up to measure the distance across a wide canyon. Notice round white viewing screen on the back of the instrument.

ABOUT LANDS IN ALASKA

Under the Alaska statehood legislation, the new State of Alaska will, upon formal admission to the Union, receive a quantity grant of about 103 million acres of lands that are now in Federal ownership. Most of these lands will be taken from the vacant, unappropriated public domain.

The specific lands which will be transferred to State ownership were not spelled out in the law. The new State will have 25 years during which to select the granted lands. The specific location of lands which the new State may select will only be known at the time the State actually selects the lands or otherwise makes its detailed selection program known.

There is no way of knowing at this time what specific plans or programs the new State may develop for the administration of lands it acquires under the grant. There are a wide variety of potentially possible alternatives open to the new State (leasing, sale, and so forth), any one or all of which may be applied to specific lands or areas. When the State Government has developed and adopted its own land and resource development and management programs, it is assumed that those programs will receive appropriate publicity from the State Government.

Regarding Federal lands in Alaska, it is possible to stake mining claims, homestead, and otherwise obtain or use vacant public lands in Alaska under the laws and regulations. Alaska statehood will not in itself change these Federal programs. Of course, over the years and as the new State selects lands and obtains title to them, the total area of federally owned lands will be reduced. To this extent at least the Federal programs will change.

A booklet "Information Relative to the Use and Disposal of Public Lands and Resources in Alaska," Information Bulletin No. 2, published by the Bureau of Land Management, is available for 20 cents a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

TWO NEW OFFICES

In order to provide better services for the public and meet the growing demands for public lands and resources, BLM has established two new field offices.

A district forestry office is now located in Ukiah, California, at 307 N. Main Street.

A district grazing office has been set up at Bridger, Mont., serving public lands in seven Montana counties.

ON THE BOOKSHELF

The Federal Lands: their use and management, by Marion Clawson and Burnell Held (Baltimore: Johns Hopkins Press, 1957), 501 pages. Dr. Clawson is former Director of the Bureau of Land Management.

American Agriculture: Geography, Resources, Conservation, by Edward Higbee (New York: John Wiley & Sons, 1958), 399 pages.

Beginnings of American Rectangular Land Survey System, 1784–1800, by William D. Pattison.

doctoral dissertation at the University of Chicago, om whom copies are available.

Timber Resources for America's Future, Forest Report No. 14, Forest Service, U. S. Department of Agriculture, January 1958. 713 pages. Copies are available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. at $7.

LEGISLATION PROPOSED

Legislation to prevent the subdividing of Federal oil and gas leaseholds into leases covering less than 640 acres has been urged by the Department of the Interior, Secretary Fred A. Seaton announced.

He said the proposed minimums would protect unwary investors against misleading advertising promotions which imply that many average citizens can "strike it rich" by speculating in a subdivided lease covering a small holding, usually 40 acres.

The legislative safeguards were requested in a letter to Speaker Rayburn of the House of Representatives. Certain exceptions to the 640-acre minimum would be provided. "One necessary exception would be where the entire acreage of an existing valid lease is less than 640 acres," the report said. "Other exceptions would be where here is evidence that exploration or development ill actually be undertaken in the assigned area."

"In past years many persons advertising in newspapers and periodicals throughout the Nation have offered for sale to the public 40-acre oil and gas leases issued by the Government," the legislative report said. "The customary price for the sale of such a lease is $100. In their advertising these persons have implied that many can be lucky enough to 'strike it rich', relying solely on the information offered.

"In their advertisements such psychologically encouraging items are employed as maps which show oil activities within the particular State. Generally speaking, the prospective customer cannot distinguish between development and wildcat drilling.

"In reality, the profitable leasing of lands for oil and gas cannot be based simply on such information but must, rather, be the result of the use of technical skill and science and by the investment of considerable sums of capital.

"The average layman, inexperienced in the oil industry and ignorant of the time and effort needed in the selection of drilling sites, can be easily misled by advertisements which report oil strikes."

The report charged that such advertisements caused an unprecedented, tremendous influx of oil and gas lease offers for 40-acre tracts and imposed a heavy burden on the various land offices. In 1952 steps were taken to restrict issuance of oil and gas leases of less than 640 acres. But advertisers were still permitted to subdivide their larger leases and assign or sublease 40-acre tracts.

The report called for an amendment to the Mineral Leasing Act of 1920 so that the Secretary of the Interior, under most circumstances, would be prohibited from approving any such assignment offer covering less than 640 acres.

CHANGES IN MINERAL LEASING REGULATIONS PROPOSED

Secretary of the Interior Fred A. Seaton has announced proposed amendments to the Federal oil and gas leasing regulations which would spell out in greater detail the Government's procedures and requirements in connection with the acreage limitation provisions of the Mineral Leasing Act.

Under the mineral leasing law no person or company may hold more than 46,080 acres in Federal oil and gas leases in any one State or more than 100,000 acres in Alaska.

Under the proposed changes in the regulations, acreage in applications or offers for oil and gas leases would be included in calculations of acreage held and subject to the limitations. Though this is not a new practice, it is now being specifically spelled out in the regulations. The acreage limitations have been construed consistently to apply to lease applications and offers as well as to leases almost since the enactment of the Mineral Leasing Act, Secretary Seaton said.

Applications and offers for leases committed to a unit or cooperative plan and included in an operating, drilling, or development contract approved by the Secretary of the Interior would continue to be excluded in counting up the accountable acreage of lease holders.

The proposed amendments to the regulations also provide that the Bureau of Land Management may require anyone applying for a lease to file a sworn statement showing his complete lease holdings including any leases which he may not himself own but in which he may have a partial or indirect interest. Lease applicants (offerors) will thereby be subject to the same requirements as may now be made of lessees and lease operators. If anyone exceeds the acreage limitation the last lease or leases acquired by him which create the excess acreage holding may be canceled, or he may be compelled to dispose of them.

The proposed changes in the oil and gas regulations also provide that anyone submitting a lease offer must furnish the Bureau of Land Management a signed statement that he is the sole party in interest in the offer and any lease which may result from it. If he is not the sole party in interest, he must give the complete details about other interested parties including the nature and extent of any oral or written agreement between

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ABANDONED HORSES

(Continued from page 3)

ample authority to prohibit such practices, but if they do take place they have occurred without the knowledge of the authorities. Inhumane treatment of any animal is not tolerated by officials of the Bureau or by any other Government agency. The real cruelty is the slaughter by predators of unclaimed animals that have been turned out on the range. These predators take their toll when the horses are too weak from starvation to protect themselves.

Many animal lovers, in the belief that the wild mustang still exists but is rapidly disappearing from the Western range lands, have urged the creation by the Federal Government of a wild horse refuge. There are already a number of wildlife refuges and game ranges in the West and a few unclaimed horses are reported to be found on them from time to time. But here, as well as on the public range, they present a management problem because of their competition with other forms of wildlife and domestic stock.

It is extremely doubtful that the creation of a refuge for abandoned horses would be practical because they are constantly moving long distances in search of food and forage and it would be difficult to confine them to a restricted area. The Bureau estimates that there are approximately 15,000 to 20,000 abandoned horses still on Western range lands. Should it ever develop that they are actually facing extinction it seems certain that some form of public protection will be given them.

While the total horse population has decreased materially with the general use of tractors, the popularity of light horses is emphasized by the fact that today there are 13 times as many as there were in 1918, one of the reasons being the large number of saddle horse clubs. Also, it is estimated that there are 500,000 cow ponies on Western ranches, a number which will remain constant, since no substitute has been found for the cow pony in handling range livestock.

According to the U. S. Department of Agriculture, the total horse population (including mules) in the United States in 1957 was estimated at about 3½ million head. This number has been declining for many years, but may be levelling off. By comparison, there were an estimated 23 million horses and mules in the United States in 1910.

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The Wild Horse of the West, by Walter D. Wyman, Caxtzon Printers, Caldwell, Idaho, 1945.

End

CORNFIELD WASH

(Continued from page 5)

Survey six years ago, specific information is now being obtained on runoff and sediment movement in the Cornfield Wash area. Accurate hydrological information is exceedingly valuable in determining basic designs for the construction of detention dams. A storage factor of one-half acre foot of sediment per square mile of drainage area per year has been found inadequate. Up to three acre feet of sediment per square mile of drainage area per year have been recorded by the Geological Survey in Cornfield Wash. Sediment now occupies approximately one-half of the storage capacity of the eighteen Bureau structures in Cornfield Wash. Ways and means to extend the life of these structures is a serious problem demanding and receiving attention.

Holding soil in place by an improved vegetal cover will retard the sediment deposition rate. There is an added need, however, to achieve sediments deposition in the gullies themselves before lodgment in the storage areas of the detention dams. Such deposition would not only lengthen the life of the dams but also would contribute materially to the process of reestablishing the original valley floors.

One method used to achieve restoration of valley land and to protect earthwork structures has been the construction of woven wire check dams across the low places in the valley (swales) above the storage basins. These wire checks extend to grade on either side and are not over two feet high at the low points of the swales. Being level across the top, they serve as weirs and widen the flood flows, thus reducing cutting by the overpour. Vegetal material from the watershed collects against the wire checks; flow velocity through the wire mesh is reduced; and sediment settles out. Gradually, the gully begins to regrade upstream from the wire checks.

As the gully regrades upstream, the water table rises and moisture is available to the relatively shallow rooted forage grasses. Weeds and other annuals are first to become established. As organic matter and soil deposition increases, grasses come in. Restoration thus has begun and the treated areas become increasingly productive. In the beginning, the recovered acreage is small. One important aspect, however, is that the range user can see the improvement and begin to graze the land again.

Small earth diversions are constructed across and beside gullies. These are used primarily where large flows are controlled by detention dams upstream. The result is that soil accumulated from sheet erosion and bank sloughing remains in place where more moisture is retained and is available for plant growth. Here again weeds and forbs come in first, then grasses return and production is increased. Fencing is necessary to

protect certain areas, especially the series of small diversions along the main gully.

Given reasonable opportunity, native western wheatgrass flourishes in the swales of Cornfield Wash, alkali sacaton on the heavy soil flats, and gallets grass on the rolling hillsides. Rainfall and other climatic conditions are too erratic for successful seeding with crested wheatgrass. Where runoff is retarded, sweet clover and brome grass respond in years of favorable rainfall.

Cornfield Wash is an upper drainage of the Rio Puerco Watershed which is one of the major tributaries of the Rio Grande. The Rio Puerco drainage is reputed to be the source of over half of the sediment that obstructs the main channel of the Rio Grande, but it is reputed also to produce only one-sixth of the water flowing into the Rio Grande above Elephant Butte Reservoir. This relationship of high sediment yield to low water yield has not always been so. Grasslands once occupied a much higher portion of the Rio Puerco Watershed. Studies indicate that the present day earth canyons of the Rio Puerco have been cut within the last 100 years. Extensive irrigation farming carried on in the valley in 1890 has now been practically abandoned. Six villages have ceased to exist. Valleys once farmed and grazed are gone. Drainages are gullied to the divides and much of the range land has now eroded away. The soil that has been washed out of the valley fills and scalped from the top soil of the surrounding range areas created havoc locally and continued to do so downstream.

There has been an extreme deficiency of water in storage in the Elephant Butte Reservoir in most years since 1941. This short supply has caused the downstream irrigationists to view with alarm any activity in the upper watershed that would reduce runoff. Accurate information regarding the effect of improved range management and the various erosion control measures on the net yield of water is imperative. The Geological Survey study referred to is the beginning of the development of such information.

The long term and the short term benefits of the conservation program both have a place and need to be understood in their perspective. For example, in 1956, a year of scant rainfall, the pitted areas in the Cornfield Wash yielded very little runoff. Flow from the unpitted tribuaries was about normal. In 1957, a year of more or less average precipitation, runoff from the pitted areas was reduced approximately half. A very heavy storm occurred in July, 1951. The Geological Survey estimated that this one storm would have produced a peak flow of between 6,000 and 8,000 cubic feet per second had there been no detention dams to contain the flood. Such a flow doubtless would have destroyed, in large measure, the remaining Indian farm land, would have seriously damaged the range, and would have increased sediment deposition downstream.

DIVERSION DIKE across the main Cornfield Wash soon after construction. Deep gullies and sparse vegetation mark beginning of conservation program.

STABLE SOIL AND GRASS show progress of watershed program. The diversion dike is in the background.

To date, it may be observed with certainty that the conservation program in Cornfield Wash has produced enthusiasm to face up to the problems that seem at times to be overwhelmingly complex and titanic. The forces of erosion are dynamic and continuous. To cope with these forces, it takes understanding, enthusiasm and cooperation on the part of the land users as well as on the part of those in the Bureau. The Cornfield Wash area will continue to serve as a successful proving ground for conservation work. **End**

Within the United States, 21 of the 48 States border on the seacoast, and contain more than 55 percent of the population and 65 percent of the Nation's industries.

INTENSIFIED MANAGEMENT

(Continued from page 7)

tion purposes, for summer homes away from the urban areas, for hunting and fishing, for parks and public picnic grounds. Many of the facilities at present recreation areas are vastly overcrowded; in other areas lands are being used for recreation purposes where no facilities are now available.

In 1956 the National Parks played host to nearly 55 million visitors, up to 10 percent over the previous year. It has been estimated that in 1958 the National Parks will be handling three times as many visitors as in 1946. In recognition of America's park needs, the National Park Service has inaugurated a program called MISSION 66, a 10-year program to put the parks in shape to take care of the 80 million people who are expected to visit them in 1966. The Forest Service has a similar program on National Forest lands called OPERATION OUTDOORS.

In this effort, you will be interested to know that the Bureau of Land Management is cooperating with the National Park Service, State and local Governments, and private organizations to inventory needs and develop programs for recreation land use on areas of the vacant public domain and the O&C lands of western Oregon.

Other demands for land come from industries seeking locations for new plants and production facilities, sometimes far away from present towns and cities. New communities will grow up around such developments. And, as our urban centers of population expand, other people move further into the hinterlands and make their permanent homes there.

From all of these big numbers that I have been using, and from the driving forces which they represent, it is obvious that there will be increasingly important competing demands for land use, and for the natural resources which the land holds.

I should emphasize at this point that all of the things I have been talking about apply to the Nation as a whole. They will apply to both the private and the public sectors of the national economy. They will affect privately owned resources, and those that are managed publicly.

The job of planning and programming for the Nation's land and resource needs will be broadly shared by the Bureau of Land Management, other Federal agencies, State and local Governments, organizations, the industrial and business community, and individual private citizens.

As the custodian of the remaining 400 million acres of unreserved public domain lands in the United States and Alaska, the Bureau of Land Management will continue to play an increasingly important role in the development and intensification of public land and resource management. **End**

MEASURING DISTANCES

(Continued from page 9)

does require a lot of effort to move it over long distances. It may also be possible to devise a power supply that does not use wet batteries.

Electronic distance measuring equipment will probably have its most practical application in those areas of the unsurveyed public lands where the full benefits of its spectacular capabilities for measuring long distances can be fully realized. Where distances to be surveyed are shorter, the conventional measuring methods may still be more practical.

In Alaska, where there are needs to greatly accelerate the public land survey program to facilitate land management and development programs, and in some areas of the western States, however, electronic distance measuring systems may offer important new means of speeding up the survey program.

The adoption of this equipment is part of the Bureau's continuing program to keep abreast of scientific and technical changes in all of its responsibilities for the conservation and management of our public lands and resources. **End**

TAKING A READING across several miles will eliminate need for many miles of footwork.

ACTIVE ACRES

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them. This statement of interest in the lease must be signed by all of the interested parties. This specific part of the regulations is a new requirement, strengthening the administration of the acreage limitations by providing for the full disclosure of parties having an interest in an oil and gas lease, and thereby preventing people from exceeding the acreage limitation by accumulating partial interest in leases which were not issued in their own names.

Another section of the regulations provides that no lease will be issued and no transfer or operating agreement will be approved by the Department until it has been shown that the people or companies are entitled to hold the acreage or obtain the operating rights involved. The Department will also have the specific authority to take any necessary action regarding excess acreage holdings even though every possible combination of circumstances leading to excess acreage may not have been specifically covered in the language of the regulations.

O & C Counties Receive Over $10.9 Million

The 18 counties of western Oregon entitled to share in receipts from timber sold during the last fiscal year have received checks totaling more than $10.9 million from the Bureau of Land Management.

Each of the counties received a check for more money than it received a year ago. The checks represent net payments to the counties of their share of gross timber sale receipts which amounted to over $21.9 million in fiscal year 1958.

The counties are entitled to 75 percent of gross receipts, but under an agreement with the counties, about $5.5 million has been retained by the Federal Government as the counties' contribution toward the costs of access road construction on the O&C lands.

The checks ranged in amount from about $39,512 for Lincoln County to $2,755, 952 for Douglas County.

The amount distributed to the counties is about $1.2 million more than was paid out a year ago, representing an increased timber harvest of from 624.5 million board feet in 1957 to a new high of more than 760.7 million board feet in 1958.

About $2.8 million of the total sent to the counties came from timber sold by the Forest Service, United States Department of Agriculture, on the half-million acres of O&C lands which it administers. **End**

The geographic center of the State of California is located in Madera County, about 35 miles northeast of Madera; Idaho's geographic center is in Custer County, about 24 miles southwest of Challis.

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